SPECIFIC OPERATIONS CHECKLIST

THERMAL INSULATION MATERIALS

Instructions to the Assessor: The checklist addresses specific accreditation criteria prescribed in Section 285.33, *Criteria for Accreditation*, of the Thermal Insulation Materials (TIM) Program Handbook. Included also are instructions and comments sheets used for observing actual demonstrations of the performance of selected test methods. These criteria **do not** supersede the *Criteria for Accreditation*, based on Section 285.33 of the *NVLAP Procedures and General Requirements* (NIST Handbook 150), which are addressed in the GENERAL OPERATIONS CHECKLIST.

Place an "X" beside any of the following items which represent a deficiency. Place a "C" beside each item on which you are commenting for other reasons. Record the item number and your deficiency explanation and/or comments on the appropriate comment sheet(s). Place a check beside all other items you observed or verified at the laboratory.

1 QUALITY SYSTEM

_____ 1.1 The quality manual (or supporting documentation) provides detailed procedures (including descriptions of equipment) that the laboratory follows in conducting thermal, physical, mechanical, and chemical measurements using the different thermal insulation test methods for which it seeks accreditation.

_____ 1.2 The quality manual (or supporting documentation) lists the range (e.g., size, shape, density, and property level) of test specimens that a laboratory can test for each test method.

_____ 1.3 The quality manual describes practices for maintenance and calibration of the equipment used in conducting the tests on thermal insulation materials.

2 PERSONNEL

Personnel competency for Thermal Insulation Materials testing includes applicable portions of the following, as a minimum:

_____ 2.1 general requirements of the test methods;

_____ 2.2 specimen preparation, dimensional measurements, mounting techniques;

_____ 2.3 operation of environmental control apparatus, including humidity cabinets;

_____ 2.4 procedures for environmental conditioning of specimens;

_____ 2.5 determination of moisture content, specific gravity, or density;

_____ 2.6 operation of drying ovens and furnaces;

_____ 2.7 description of specimen and test setup;

_____ 2.8 operation of balances and scales for mass determination;

_____ 2.9 use of dimensional measuring devices (calipers, micrometers, etc.);

_____ 2.10 verification of performance of apparatus and equipment (e.g., using secondary standards);

_____ 2.11 calibration of test machines;

_____ 2.12 calibration of load/deformation/strain-recording equipment;

_____ 2.13 operation of fire performance test equipment;

_____ 2.14 thermocouple mounting and related instrumentation;

_____ 2.15 operation of heat flux meters and pyrometers;

_____ 2.16 use of automatic data logging and readout instrumentation;

_____ 2.17 operation of ammeters, ohmmeters, voltmeters, wattmeters, potentiometers;

_____ 2.18 operation of radiant panel;

_____ 2.19 operation of heat flow meters;

_____ 2.20 operation of guarded hot plates;

_____ 2.21 calculation of thermal parameters (transmittance, conductance, conductivity, resistance, etc.), if applicable.

3 CALIBRATION AND TEST METHODS

3.1 Laboratory Operations and Test Standards

_____ 3.1.1 Samples and test specimens are uniquely identified for correlation with related records.

_____ 3.1.2 Test data forms (as required by the reference standard or developed in-house) are properly completed.

_____ 3.1.3 The laboratory maintains a dated log book or record for the tests it performs.

_____ 3.1.4 Measurement equipment is appropriate for the test method.

_____ 3.1.5 The latest version of the test standards for which the laboratory seeks accreditation is available.

3.2 Calibration Requirements

Test equipment, devices, and instruments meet the requirements of the appropriate standards and are properly calibrated (and meet calibration conditions). Specific calibration requirements for the TIM program are:

- in accordance with the manufacturer's recommendation;
- the test method; or
- as specified in the following table;

whichever results in shorter time periods between calibrations.

Apparatus/Instrumentation	*Calibration or Verification Frequency*
dimensional measuring devices (calipers, micrometers, etc.)	annually
drying ovens	annually
furnaces	annually
tensile/compression test machines and load cells	annually
scales and balances	annually
heat flux meters	annually
pyrometers	annually
automatic data logging and readout*	annually
ammeters, ohmmeters, voltmeters, wattmeters*	annually
potentiometers*	annually
thermocouple and related instrumentation*	annually
thermostats*	annually
environmental conditioning units	quarterly
humidity cabinets	quarterly
radiant panel	per test method
heat flow meters**	per test method
guarded hot plates	per test method

* If the calibration of the equipment is shown to vary due to the lack of modern solid-state electronics, then the entry under *Frequency* shall be 6 months.

** If certification of measurement is required using ASTM C518 (NVLAP Test Method Code 01/T06), the calibration procedures and frequencies given in Section 5.4.1 of that test method must be followed.

3.3 Thermal, Mechanical, Physical, Flammability and Chemical Properties

_____ 3.3.1 Samples are properly prepared, environmentally conditioned (including proper moisture content), handled, and maintained before testing.

_____ 3.3.2 Measurements of specimen dimensions and mass are determined correctly; descriptions of important sample characteristics are recorded when required.

_____ 3.3.3 Test(s) are conducted within the specified temperature, humidity, and/or air flow conditions.

_____ 3.3.4 Where thermal measurements are critical, procedures for adequate calibration checks and verification of equipment performance need to be documented to ensure that accurate and repeatable thermal measurements are obtained, which are traceable to national standards.

_____ 3.3.5 Where criteria on the accuracy of the average power are required (e.g., ASTM C976, Par. 5.8.1.4; ASTM C236, Par. 6.6.2), the laboratory has sufficient documentation to demonstrate that the criteria are met.

_____ 3.3.6 Where criteria on the accuracy of thermocouples or other temperature sensors are required (e.g., ASTM C976, Par. 5.7.2.3; ASTM C236, Par. 6.6.1), the laboratory has sufficient documentation to demonstrate that the criteria are met.

_____ 3.3.7 Where error analyses are required (e.g., ASTM C518, Sec. 9), the laboratory has written procedures and documentation which demonstrate that the error analysis requirements are met.

_____ 3.3.8 Documentation must be available to ensure that temperature measurements are traceable to national standards.

_____ 3.3.9 Thermal insulation specimens and products are tested in the specified orientation, if any, and with proper test setup.

_____ 3.3.10 For mechanical testing, the proper rate of load, strain, or deformation is applied to the specimen.

TIM SPECIFIC OPERATIONS CHECKLIST - COMMENTS AND DEFICIENCIES

Instructions to the Assessor: Use this sheet to document comments and deficiencies. For each, identify the appropriate item number from the checklist. Identify comments with a "C" and deficiencies with an "X." If additional space is needed, make copies of this page (or use additional blank sheets).

Item No.	*Comments and/or Deficiencies*